

YOR920010335
Amendment dated 05/27/2008

09/917,818
Reply to office action mailed 02/25/2008

00280706aa

Correction to the Drawings:

The attached drawing sheets 5, 6, 7, 9 and 10, containing Figs. 5, 6, 7, 9 and 10, replace the original drawing sheets 5, 6, 7, 9 and 10.

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REMARKS

Claims 1-3 are currently pending in the application, claims 4-11 having been canceled and pursued in a continuation application. The foregoing separate sheets marked as "Listing of Claims" show all the claims in the application, with an indication of the current status of each.

In the prior office action the Examiner had objected to the drawings under 35 CFR §1.83(a) as not showing every feature of the invention specified in the claims. The prior response reviewed the claims as recently amended and argued, with assistance from an Article 132 Declaration from the inventors, that the specification and drawings elucidate the claimed features of the invention in compliance with 35 CFR §1.81(a) and 35 CFR §1.83(a). The objection to the drawings has not been renewed, and therefore it is presumed that the objection has been withdrawn. However, it is noted that certain proposed drawing corrections were submitted on 1/28/2003 and approved in the office action mailed 10/30/2003. Replacement sheets incorporating these drawing corrections are attached herewith in Appendix A, and an indication of their acceptance is requested in the next office action.

The Examiner has rejected claims 1-3 under 35 U.S.C. §103(a) as being unpatentable over the article "Bidding and Allocation in Combinatorial Auctions" to Nisan. It will be observed that Nisan is directed to sealed bid auctions (page 6), and is further directed toward an analysis of bidding languages to compare their relative power (page 4) in terms of "expressiveness" and "simplicity" (page 3), concluding that one language, "OR-bids with phantom items", can polynomially simulate the others (Abstract). Nisan then considers the problem of determining the best allocation (page 14), suggesting an approach based on Linear Programming and drawing certain conclusions concerning the solubility of the auction allocation problem. In particular, there is an optimal allocation only if prices can be attached to

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single items in the auction (Abstract), which occurs only where LP relaxation produces integer solutions (page 16).

The claimed invention is directed to an improved computer implemented method for selecting bids in a reverse combinatorial auction. The method according to the invention automatically selects the optimal bid when commodities are offered in bundles by automatically generating an algorithm which may be implemented on a computer for solving the cost-minimization problem. The auction is run as a procurement auction, where the buyer (e.g., a manufacturer) wishes to purchase different items of varying quantities for the cheapest overall price. The total quantity of each item is referred to as a lot and is treated as an indivisible unit of some weight. Suppliers can bid on combinations of items; however, a bid on any item has to be for the entire lot for that item. The present invention identifies the optimal solution to the so-called winner determination problem for a single-unit reverse combinatorial auction by selecting a winning set of bids such that each item is included in at least one winning bid. As a result, the total cost of procurement is minimized. This problem is a set covering problem, which is known to be NP-hard. NP-hard problems are problems that are difficult to solve and the amount of effort (in terms of the time required on a computer) increases exponentially as the size of the problem (such as number of bids) increases. For example, if the number of bids goes from 100 to 200, then the time required to solve the problem might go from 10 seconds to 100 seconds (not 20 seconds).

The claimed invention provides an algorithm for identifying a cost-minimizing bid set in a reverse combinatorial auction subject to various business rules for all-or-nothing bundled bids, and second by providing a method for automatically generating this algorithm in a form that can be used with commercial Linear Programming/Integer Programming (LP/IP) solvers. In accordance with the invention, a computer-implemented formulation is generated by populating a set of matrices. Since the matrix is generally sparse, it is represented in a sparse form by

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providing only the non-zero terms. This is done by specifying a large array of non-zeros indexed by an integer array that indexes the row number for each non-zero entry. Additionally, two column vectors are specified that indicate the column index for the non-zero entry. These arrays are automatically generated, and the matrices are then automatically generated based on the formulation of the present invention.

The result of the claimed method is selection of a cost-minimizing set of bids covering the items bundled in the auction as winner.

The Examiner asserts broadly, without specific citations to the Nisan article, that the elements of claim 1 are satisfied. Since Nisan limits his analysis to sealed bids, and since the present invention includes more than sealed bids, the implicit argument of the Examiner is that claim 1 reads on the disclosure of Nisan.

Without going into a detailed analysis, claim element by claim element, to show that Nisan fails to disclose the present invention as claimed, since the Examiner has not put forward his *prima facie* argument in that manner, it will be sufficient to identify certain claim limitations that are missing from Nisan. In particular, Nisan says nothing about time stamps, which figure prominently in the claimed algorithm's weighting of earlier submitted bids. In the claimed invention each bid has a timestamp (claim 1, line 4), and the timestamp figures in the objective of choosing bids that arrive early (claim 1, lines 16-18), in the introduction of price modifications, which are used to adjust the objective of choosing bids that arrive early (claim 1, lines 19-21), and in the selection of a cost-minimizing bid set based on several factors including time stamps and the formulation given to the objective of choosing bids that arrive early (claim 1, lines 22-26).

No structure or methodology comparable to the use of time stamps is described or suggested by the analysis provided by Nisan. Nisan fails as a reference on that account alone. It may be observed that the addition of a time-stamp valuation may allow the claimed invention to achieve solubility and tractability in the broader class of situations beyond the limited sealed-bid addressed by Nisan.

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In addition, however, it should be noted that Nisan primarily discloses analytical conclusions rather than solutions as claimed. For example, it is disclosed that "if an auction has only single item bids then the LP solution provides an optimal allocation" (page 19, corollary 6.4), and that "if the auction has only downward sloping symmetric bids then the LP solution provides an optimal allocation" (page 19, corollary 6.5). Nisan then contains a section dealing with non-integer solutions, in which he presents a Greedy algorithm (page 21, section 7.1) and a Branch-and-bound allocation algorithm (page 21, section 7.2). These algorithms are described in detail, but bear no apparent correspondence to the claimed invention. For example, the latter algorithm uses an Upper Bound Algorithm and a Lower Bound Algorithm not contained in the claimed invention or disclosure. Presumably, these are methodologies for simplifying the solution problem, and thereby making the solution tractable. There are undoubtedly many such particular methodologies, and the present invention has its own such methodological component (described above with regard to time stamps).

In view of the foregoing it is believed that no prima facie case of obviousness has been established with regard to claim 1 or, consequently, the claims dependent on claim 1, and that Nisan has been overcome as a reference.

In view of the foregoing, it is requested that the application be reconsidered, that claims 1-3 be allowed, and that the application be passed to issue.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at 703-787-9400 (fax: 703-787-7557; email: clyde@wcc-ip.com) to discuss any other changes deemed necessary in a telephonic or personal interview.

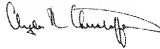
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If an extension of time is required for this response to be considered as being timely filed, a conditional petition is hereby made for such extension of time. Please charge any deficiencies in fees and credit any overpayment of fees to Deposit Account 50-0510 (IBM-Yorktown).

Sincerely,

A handwritten signature in black ink, appearing to read "Clyde R. Christofferson", with a long, sweeping horizontal stroke at the end.

Clyde R Christofferson
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APPENDIX A